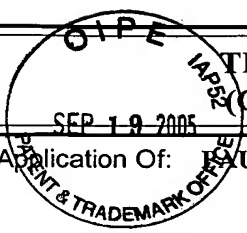


AF/IFW



<b>TRANSMITTAL LETTER</b> (General - Patent Pending)	Docket No. <b>ACH 2947 US</b>
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In Re Application Of: **RAUL O'CONNOR, ET AL**

Application No. <b>10/603,274</b>	Filing Date <b>JUNE 25, 2003</b>	Examiner <b>CHRISTINA JOHNSON</b>	Customer No.	Group Art Unit <b>1725</b>	Confirmation No. <b>4476</b>
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Title: **FCC CATALYST FOR REDUCING THE SULFUR CONTENT IN GASOLINE AND DIESEL**

COMMISSIONER FOR PATENTS:

Transmitted herewith is:

**REVISED BRIEF ON APPEAL (IN TRIPLICATE) IN RESPONSE TO OFFICE ACTION OF 08/16/05;  
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in the above identified application.

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*Marcy M. Hoebling*  
 \_\_\_\_\_  
*Signature*

Dated: **SEPTEMBER 16, 2005**

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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of: Paul O'Connor, et al.

Application No.: 10/603,274

Filed: June 25, 2003 Docket No.: ACH 2947 US

Examiner: Christina Ann Johnson

For: FCC CATALYST FOR REDUCING THE SULFUR CONTENT IN GASOLINE  
AND DIESEL

## BRIEF ON APPEAL

Appeal from Group 1725

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I. INTRODUCTION

This is an appeal from a final Office Action for the above-identified patent application, mailed January 6, 2005 rejecting claims 1-9 and objecting to claims 10-14, which are all of the claims in the application.

A. Real Party In Interest

The real party in interest for this appeal and the present application is Albemarle Netherlands B.V., by way of an Assignment from Akzo Nobel N.V. (copy attached); the Assignment has been sent to the USPTO for recording, but is not yet recorded. The Assignment showing ownership by Akzo Nobel N.V. is recorded in the U.S. Patent and Trademark Office at Reel 013985, Frame 0994.

B. Statement Of Related Appeals And Interferences

There are presently no appeals or interferences, known to Appellants, Appellants' representative or the Assignee, which will directly affect or be directly affected by or have a bearing upon the Board's decision in the pending appeal.

C. Status Of Claims

Claims 1-15 are pending. Claims 1-9 stand finally rejected and are on appeal. Claims 10-14 are indicated by the Examiner to be allowable if rewritten in independent form including all of the limitations of the base claim and

any intervening claims. Claim 15 is withdrawn pursuant to a restriction requirement.

Claims 1-15 are set forth in the attached Appendix.

D. Status Of Amendments

No amendment was filed after final rejection.

E. Summary of Claimed Subject Matter

As defined in claim 1, the single independent claim involved in the appeal, the present invention is a catalyst composition comprising about 5-55 wt% metal-doped anionic clay, about 10-50 wt% zeolite, about 5-40 wt% matrix alumina, about 0-10 wt% silica, about 0-10 wt% of other ingredients, and the balance kaolin (see page 3, lines 3-6 of the specification). The anionic clay is obtained by a process comprising mixing a trivalent metal source and a divalent metal source, at least one of them being water-insoluble, in aqueous suspension (see page 7, lines 16-19 of the specification).

The invention also comprises a process for making the above composition wherein zeolite, metal-doped anionic clay, alumina, kaolin, and optionally silica and other ingredients are mixed in aqueous suspension and subsequently shaped to form particles.

F. Grounds of Rejection to be Reviewed on Appeal

The grounds for rejection are that claims 1-4 are anticipated by EPO 278 535, and that claims 1-9 are obvious over WO 01/12570 in view of EPO 278 535.

II. ARGUMENT

Rejection Under 35 USC § 102

The composition of the present invention comprises a unique combination of components, including about 5-55 wt% metal-doped anionic clay and about 5-40 wt% matrix alumina. The term "metal doped anionic clay" has a special meaning as explained in the second full paragraph on page 7 of the instant text, which is anionic clay prepared by a process wherein the metal additive(s) is/are present during the formation of the anionic clay. This is distinguished from impregnation that is performed after the formation of anionic clay has been completed.

These metal-doped anionic clays are prepared by aging an aqueous suspension of divalent and trivalent metal source, at least one of them being water-insoluble, optionally followed by thermal treatment, i.e. calcination, and rehydration to form anionic clay again. The dopant is introduced during one of these steps (see page 7, lines 16-26).

The thermal treatment can be conducted at 150-900°C (page 8, lines 25-28). Anionic clays, e.g. hydrotalcite, begin to decompose at a temperature below 200°C, which

decomposition is reversible. Due to this reversibility, the thermally treated anionic clay can be transformed into anionic clay by way of rehydration.

Matrix alumina, as explained in the first paragraph of page 5 of the specification, means that the alumina is present in the continuous phase.

It is also important in preparing the composition of the present invention that the anionic clay is obtained by a process comprising mixing a trivalent metal source and a divalent metal source, at least one of them being water-insoluble, in aqueous suspension. This results in anionic clay having a physical structure fundamentally different than if the trivalent and divalent metal sources are both water soluble and co-precipitated. The unique structure of the anionic clay used in the composition of the invention will have a positive affect on the performance of the composition of the invention when used to produce gasoline and/or diesel having reduced sulfur content.

The superiority of the catalyst composition of the present invention is amply demonstrated in Example 7 of the instant text, where the use of a Zn-doped anionic clay resulted in a sulfur reduction in an FCC unit gasoline product which was 17% higher than the sulfur reduction resulting from the use of a Zn-impregnated anionic clay.

It is particularly important to note that the anionic clays prepared in accordance with the process of the invention, as illustrated in Examples 3, 4 and 6, are shown by X-ray diffraction pattern to be fundamentally different

in structure than anionic clays prepared with a known process, as illustrated in Comparative Examples 1, 2 and 5. The difference resides in the degree of homogeneity of dispersion of the doping phase within the clay. Once again, reference is made to Example 7 that shows the superiority of clay having the unique structure of the present invention with regard to sulfur reduction.

The compositions of '535, such as shown in its example 6, are prepared by calcining anionic clay for 2 hrs. at 600°C, impregnating the calcined material with rare earth metal salts using standard impregnation conditions and calcining the impregnated material for a second time under the same conditions.

A standard impregnation technique is incipient wetness impregnation as used in WO 99/49001, cited in the instant application in the paragraph bridging pages 1 and 2: see WO 99/49001's Examples 1 and 2. Incipient wetness impregnation involves filling the pores of a solid with an amount of solution equal to the pore volume, followed by drying. Hence, incipient wetness impregnation of calcined anionic clay involves contacting of the calcined clay with a calculated, small amount of liquid for only a short time, during which the pores become filled. This is not a rehydration and will not result in the formation of anionic clay again.

'535 mentions on page 4, lines 26 and 27 that rare earth metals may be taken up into the sulfur oxides binding material by coprecipitation of compounds of these metals during the preparation of the anionic clay, but gives no



hint to the requirement of the instant claims that the anionic clay is obtained by a process comprising mixing a trivalent metal source and a divalent metal source, at least one of them being water-insoluble, in aqueous suspension.

'535 therefore does not disclose a composition comprising a metal-doped anionic clay as employed by the present invention and is most definitely not an anticipation of the present invention.

#### Rejections Under 35 USC § 103

Instant claims 1-9 were rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/12570 ('570) in view of '535.

'570 uses shaped bodies containing at least 50 wt% of anionic clay with good binding properties (p. 11, lines 21-29). In these bodies, the anionic clay is the continuous phase, while any other optionally present material, e.g. alumina, is the discontinuous phase (p. 11, line 30, through p. 12, line 5).

However, the composition of '535, like that of the present application, requires the presence of an alumina matrix, which, as discussed above, means that the alumina is the continuous phase, while the metal-doped anionic clay is the discontinuous phase, which situation is opposite to that of '570.

The law is clear that the prior art must show not only all of the elements of the claimed combination, but must contain some "teaching, suggestion or incentive" to a person of ordinary skill to combine the known elements in the way that the Examiner combined them (United States surgical Corp v. Ethicon Inc., 41USPQ 2d 1225, CAFC 1997). The question, therefore, is what teaching, suggestion or incentive is there for one of ordinary skill in the art to combine '570 and '535, while arbitrarily rejecting teachings in those references, such as the use of anionic clay obtained by mixing solutions of trivalent and divalent metal sources in '535, and the use of alumina in the discontinuous phase in '570 to arrive at the present invention? The simple answer to that question is that there is no such teaching, suggestion or incentive.

'570, like the present invention, is concerned with the problem of the production of gasoline and diesel with low sulfur content. The compositions of '535, however, are used for the binding of sulfur oxides (p.1, lines 1-2), which are formed during the regeneration step of an FCC process (p. 1, lines 9-11). In this regeneration step, coke depositions are burnt from the catalyst and without any precautions the sulfur compounds present in the coke deposits are emitted as sulfur oxides. In '535 these sulfur oxides are adsorbed by the anionic clay-containing composition disclosed therein.

'535 does not disclose the production of gasoline or diesel low in sulfur or nitrogen. Although it says in the paragraph bridging pages 6 and 7 that the catalyst is suitable for cracking sulfur-containing hydrocarbon feeds,

it does not mention that the use of this catalyst results in the production of compounds with a low sulfur content. Therefore, the purposes or problems to be addressed in '535 differ from those of '570, which is concerned with the problem of the production of gasoline and diesel with low sulfur content, and these differences preclude any teaching, suggestion or incentive to combine '570 and '535.

Of course, even if '570 and '535 were somehow combined, the essential requirement of the anionic clay being obtained by a process comprising mixing a trivalent metal source and a divalent metal source, at least one of them being water-insoluble, in aqueous suspension would still be lacking.

III. CONCLUSION

For all of the reasons discussed above, it is respectfully submitted that claims 1-9 define patentable subject matter under 35 U.S.C. §102 and 35 U.S.C. §103, and Appellants respectfully request this Honorable Board to reverse the rejection of claims 1-9.

Respectfully submitted,

  
MARCY M. HOEFTLING

Registration No. 33,955

APPENDIX

1. A catalyst composition comprising about 5-55 wt% metal-doped anionic clay, about 10-50 wt% zeolite, about 5-40 wt% matrix alumina, about 0-10 wt% silica, about 0-10 wt% of other ingredients, and the balance kaolin, said anionic clay obtained by a process comprising mixing a trivalent metal source and a divalent metal source, at least one of them being water-insoluble, in aqueous suspension.
2. The catalyst composition of claim 1 wherein the anionic clay is doped with at least one compound containing an element selected from the group consisting of Zn, Fe, V, Cu, W, Mo, Co, Nb, Ni, Cr, Ce, and La.
3. The catalyst composition of claim 1 wherein the anionic clay is an Al-Mg-containing anionic clay, an Al-containing non-Mg anionic clay, a Mg-containing non-Al anionic clay, or a non-Mg non-Al anionic clay.
4. A process for the preparation of the catalyst composition of claim 1 wherein zeolite, metal-doped anionic clay, alumina, kaolin, and optionally silica and other ingredients are mixed in aqueous suspension and subsequently shaped to form particles.
5. The process of claim 4 wherein the metal-doped anionic clay is obtained by aging the mixture of trivalent metal source and divalent metal source in the presence of at least one metal dopant.

6. The process of claim 5 wherein the trivalent metal is selected from the group consisting of aluminium, gallium, indium, iron, chromium, vanadium, cobalt, manganese, cerium, niobium, lanthanum, and combinations thereof.
7. The process of claim 5 wherein the divalent metal source and/or the trivalent metal source are selected from the group consisting of oxides, hydroxides, carbonates, hydroxycarbonates, bicarbonates, acetates, and hydroxyacetates.
8. The process of claim 5 wherein the divalent metal is selected from the group consisting of magnesium, zinc, nickel, copper, iron, cobalt, manganese, calcium, barium, and combinations thereof.
9. The process of claim 5, wherein use is made of a metal-doped divalent and/or metal-doped trivalent metal source.
10. The process of claim 4 wherein the metal-doped anionic clay is obtained by aging a trivalent metal source and a divalent metal source, at least one of them being water-insoluble, in aqueous suspension to form an anionic clay, thermally treating the anionic clay to form a solid solution, and rehydrating the solid solution in the presence of at least one metal dopant to form a metal-doped anionic clay.
11. The process of claim 10 wherein the trivalent metal is selected from the group consisting of aluminium, gallium, indium, iron, chromium, vanadium, cobalt,

manganese, cerium, niobium, lanthanum, and combinations thereof.

12. (original) The process of claim 10 wherein the divalent metal source and/or the trivalent metal source are selected from the group consisting of oxides, hydroxides, carbonates, hydroxycarbonates, bicarbonates, acetates, and hydroxyacetates.
13. The process of claim 10 wherein the divalent metal is selected from the group consisting of magnesium, zinc, nickel, copper, iron, cobalt, manganese, calcium, barium, and combinations thereof.
14. The process of claim 10, wherein use is made of a metal-doped divalent and/or metal-doped trivalent metal source.
15. A process for the production of gasoline and/or diesel having a reduced sulfur content and/or a reduced nitrogen content comprising contacting a hydrocarbon feedstock with the catalyst composition of claim 1 at fluid catalytic cracking conditions.

UNITED STATES OF AMERICA

ASSIGNMENT

WHEREAS, AKZO NOBEL N.V. (formerly known as AKZO N.V.), a company organized under the laws of the Netherlands, having its registered office at Velperweg 76, 6824 BM Arnhem, The Netherlands, (hereinafter called the ASSIGNOR) is the proprietor of the Patent[s], Design Registration[s] and Patent Application[s] in the United States of America:

(Set forth on the attached schedule)

AND WHEREAS, ALBEMARLE NETHERLANDS B.V., a company organized and existing under the laws of the Netherlands, having its registered office at Stationsplein 4, 3818 LE Amersfoort, The Netherlands, (hereinafter called the ASSIGNEE) is desirous of acquiring the entire right, title and interest of the ASSIGNOR in and to the aforesaid Patent[s], Design Registration[s] and Patent Application[s],

NOW, THEREFORE, in consideration of ONE (1.00) EURO and other good and valuable consideration, the ASSIGNOR hereby assigns to the ASSIGNEE, its successors and assigns, absolutely all its right, title and interest in and to the aforesaid Patent[s], Design Registration[s] and Patent Application[s] including all emoluments, advantages, profits and benefits accruing or belonging thereto.

The ASSIGNOR consents to the ASSIGNEE'S proceeding with the aforesaid Patent Application[s], if any, in its own name in substitution of the ASSIGNOR and the said ASSIGNOR agrees to do all that may be required to put the foregoing into effect.

IN WITNESS WHEREOF, the said ASSIGNOR has executed this document on this 14 day of April 2005.

AKZO NOBEL N.V.

By [Signature] [Title]

By Louise A. Mours [Title]  
Attorney-in-Fact

Attest:

[Signature] 6.B. [Title]  
Attorney

IN WITNESS WHEREOF, the said ASSIGNEE has executed this document on this 14 day of April 2005.

ALBEMARLE NETHERLANDS B.V.

By Mary Hoyle [Title]  
Authorized Signatory

Attest:

[Signature] 6.B. [Title]  
Attorney

(See over for Notarial Acknowledgment)

CORPORATE ACKNOWLEDGMENT

UNITED STATES OF AMERICA ]

STATE OF New York ]

COUNTY OF New York ]

SS:

On this 14 day of April 2005, before me personally appeared David Vickrey, to me known, who, being by me duly sworn, did depose and say that he/she is the Attorney-in-Fact of the company described in the foregoing instrument; that he/she executed said instrument on behalf of the said company; that he/she is authorized to execute an instrument of this nature by order of the Managing Director of the company.

Georgia N. Gounaris  
Notary Public

[SEAL]

GEORGIA N. GOUNARIS  
Notary Public, State of New York  
No. 30-4954226  
Qualified in Nassau County  
Certificate Filed in New York County  
Commission Expires August 7, 2005

ASSIGNOR



CORPORATE ACKNOWLEDGMENT

UNITED STATES OF AMERICA ]  
STATE OF New York ] SS:  
COUNTY OF New York ]

On this 14 day of April 2005, before me personally appeared Louis Morris, to me known, who, being by me duly sworn, did depose and say that he/she is the Attorney-in-Fact of the company described in the foregoing instrument; that he/she executed said instrument on behalf of the said company; that he/she is authorized to execute an instrument of this nature by order of the Managing Director of the company.

Georgia N. Gounaris  
Notary Public

[SEAL]

GEORGIA N. GOUNARIS  
Notary Public, State of New York  
No. 30-4954226  
Qualified in Nassau County  
Certificate Filed in New York County  
Commission Expires August 7, 2005

ASSIGNOR

CORPORATE ACKNOWLEDGMENT

UNITED STATES OF AMERICA }  
STATE OF New York } SS:  
COUNTY OF New York }

On this 14 day of April 2005, before me personally appeared Mary Hoefling, to me known, who, being by me duly sworn, did depose and say that he/she is the Authorized Signatory of the company described in the foregoing instrument; that he/she executed said instrument on behalf of the said company; that he/she is authorized to execute an instrument of this nature by order of the Managing Director of the company.

Georgia N. Gounaris  
Notary Public

[SEAL]

GEORGIA N. GOUNARIS  
Notary Public, State of New York  
No. 30-4954226  
Qualified in Nassau County  
Certificate Filed in New York County  
Commission Expires August 7, 2005

ASSIGNEE

UNITED STATES OF AMERICA

SCHEDULE

In the name of AKZO N.V.

Patent No. 35406

Patent No. 4791085

Patent No. 4840724

Patent No. 4866019

Patent No. 4946581

Patent No. 4952382

Patent No. 5139990

Patent No. 5246569

UNITED STATES OF AMERICAS C H E D U L EIn the name of AKZO NOBEL N.V.

Patent No. 5609750  
Patent No. 5986158  
Patent No. 6030915  
Patent No. 6127299  
Patent No. 6150296  
Patent No. 6200464  
Patent No. 6334947  
Patent No. 6492296  
Patent No. 6503867  
Patent No. 6506358  
Patent No. 6509291  
Patent No. 6531054  
Patent No. 6534437  
Patent No. 6537442  
Patent No. 6540908  
Patent No. 6551572  
Patent No. 6555496  
Patent No. 6566293  
Patent No. 6566296  
Patent No. 6631851  
Patent No. 6652738  
Patent No. 6667023  
Patent No. 6689333  
Patent No. 6716337  
Patent No. 6822130  
Patent No. 6828153

UNITED STATES OF AMERICAS C H E D U L EIn the name of AKZO NOBEL N.V.

<u>PATENT APPLICATION NOS.</u>	<u>FILING DATE</u>
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